STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

November 7, 2003

Ms. Susan Carrington
VP and Executive Director of Michigan Dioxin Initiative
The Dow Chemical Company
47 Building
Midland, MI 48667

Dear Ms. Carrington:

SUBJECT: Limited Approval of Sampling Sections of Draft Wild Game Sampling Work Plan for the Tittabawassee River Floodplain Near Midland, Michigan and Transmittal of Technical Review Comments; The Dow Chemical Company (Dow), Midland; MID 000 724 724

Staff of the Michigan Department of Environmental Quality (MDEQ), Waste and Hazardous Materials Division (WHMD), in conjunction with staff of the Michigan Department of Natural Resources (MDNR) and the United States Fish and Wildlife Service (USFWS), has reviewed the Draft Wild Game Sampling Work Plan for the Tittabawassee River Floodplain Near Midland, Michigan (Work Plan), that was submitted on October 23, 2003. This Work Plan was submitted in accordance with Condition XI.B.3. of the hazardous waste facility operating license issued to Dow on June 12, 2003.

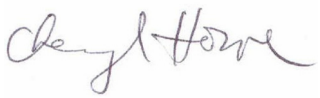
At the request of the MDEQ, plat maps showing the proposed wild game sampling locations were submitted to this office on November 2, 2003. In follow up, a field inspection of the proposed sampling locations adjacent to Smith's Crossing and Imerman Park was conducted on November 6, 2003. Based on the results of this field inspection it was determined that at the site adjacent to Imerman Park, the collection of animals should be limited to the lower field and woods adjacent to the Tittabawassee River. As discussed with Dr. Alan Blankenship of ENTRIX, Inc., on November 6, 2003, the upper portions of the proposed site are not likely to contain elevated levels of dioxins and furans and are therefore to be avoided in order to increase the probability of collecting animals that reside in contaminated portions of the floodplain. During the field inspection, Dr. Matthew Zwiernik of Michigan State University (MSU) indicated that preliminary soil sampling results from the site adjacent to Smith's Crossing contained dioxin and furan total toxic equivalence concentrations in excess of 1000 ppt. The final data must be provided in the IRA report.

The cover letter transmitting the draft Work Plan to the MDEQ requested conceptual approval so that wild game sampling can occur upon receipt of the MDNR scientific collector's permit. It is the MDEQ's understanding that the MDNR permit was recently issued. Approval to proceed with the wild game sampling sections of the Work Plan (Sections 2.1 - 2.8.3 and 2.11 - 2.12 and Standard Operating Procedures 214, 229, 230, 231, 401, and 402) is granted, provided this sampling is consistent with the enclosed technical review comments. It is not possible to proceed with conceptual review and approval of the remaining portions of the Work Plan because key sections of the Work Plan such as the Decision Document and the Quality Assurance Project Plan have not yet been submitted.

As indicated in the October 21, 2003, approval letter for the Work Scope for the Interim Response Activity (IRA) of Evaluating Wild Game Taken From the Tittabawassee River Floodplain for Human Consumption (Work Scope), the purpose of this IRA is to determine if human consumption of wild game taken from dioxin- and furan-contaminated areas of the Tittabawassee River flood plain is a human health exposure pathway that requires immediate mitigation. Therefore, when the Work Plan is resubmitted to address the enclosed technical review comments, the title should be revised to be consistent with the approved Work Scope to indicate that it is an IRA Work Plan and that the purpose is to evaluate wild game taken for human consumption. Please submit a revised Work Plan for final review and approval by November 21, 2003. If an alternate date for submittal is needed, please submit a written request to Mr. Al Taylor, Hazardous Waste and Radiological Protection Section, WHMD, at 517-335-4799 or by e-mail at taylorab@michigan.gov.

If you have any questions regarding this limited approval or the technical review comments, please contact me by e-mail at howec@michigan.gov or at the phone number below, or you may contact Mr. Taylor.

Sincerely,



Cheryl Howe, Senior Environmental Engineer
Hazardous Waste and Radiological
Protection Section
Waste and Hazardous Materials Division
517-373-9881

Enclosure
cc:

Dr. Alan Blankenship, ENTRIX, Inc.
Mr. John Phillips, Dow
Dr. Lisa Williams, USFWS
Dr. Matthew Zwiernik, MSU
Dr. Daniel O'Brien, MDNR
Mr. George Bruchmann, MDEQ
Ms. Liane Shekter Smith, MDEQ/Corrective Action File
Mr. Steve Buda, MDEQ
Ms. De Montgomery/Ms. Ginny Himich, MDEQ
Mr. Terry Walkington/Ms. Trisha Peters, MDEQ - Saginaw Bay
Ms. Brenda Brouillet, MDEQ - Saginaw Bay
Ms. Sarah Hession, MDEQ
Dr. Deb MacKenzie-Taylor, MDEQ
Mr. Al Taylor, MDEQ

Technical Review Comments
Draft Wild Game Sampling Work Plan for the Tittabawassee River Floodplain Near Midland, Michigan
Prepared by ENTRIX, Inc. and Dated October, 2003

November 7, 2003

General

1. All documents referenced as being available upon request must be provided to all of the original recipients of the Draft Wild Game Sampling Work Plan for the Tittabawassee River Floodplain Near Midland, Michigan (Work Plan). Of particular importance, the Quality Assurance Project Plan must be submitted to the Michigan Department of Environmental Quality (MDEQ) for review and approval prior to Dow or its contractors conducting any analytical work under the Work Plan. Likewise, it is not possible to fully evaluate the Work Plan without the Decision Procedure Document.

2. Once the statistics-related comments contained herein have been addressed, a preliminary approval of the data evaluation will be provided by the MDEQ. The appropriateness of the proposed methods can only be fully evaluated once the actual data are generated. Therefore, the MDEQ reserves the right to require alternate methods for evaluating the data once available.

3. The Work Plan must be revised throughout to indicate that any notifications that are being made to the Michigan Department of Natural Resources (MDNR) and the United States Fish and Wildlife Service (USFWS) will be made to the MDEQ as well.

4. The approved Work Scope for the Interim Response Activity of Evaluating Wild Game Taken From the Tittabawassee River Floodplain for Human Consumption, approved by the MDEQ on October 21, 2003, must be added to the Work Plan as an appendix.

5. Electronic copies (e.g., WORD and/or pdf format) of the Work Plan and Appendices must be provided to the MDEQ for placement on its website for public information. Several documents in the Work Plan include reservations of rights, therefore, written permission from ENTRIX, Inc. will be needed in order for the MDEQ to proceed with this. The MDEQ is obligated to release submitted documents to the public pursuant to the requirements of the Freedom of Information Act, Public Act 442 of 1976, as amended.

Work Plan

6. <u>Page 1-3, Section 1.3 - Data Quality Objectives (DQO) Step 3: Information Needed to Make the Decision, Paragraph 2</u>. Wild turkeys do not have what the USFWS would consider small home ranges. Home ranges for turkeys in

Michigan may be 640 to 2,000 acres (http://www.michigandnr.com/publications/pdfs/huntingwildlifehabitat/Landowners_Guide/Species_Mgmt/Wild_Turkeys.htm), whereas home ranges for deer and rabbits are more like 250 acres and 5 to 10 acres, respectively. The important point is that turkeys that use the Tittabawassee flood plain for at least some of the time may be accumulating polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), i.e., from incidental soil ingestion, about 10 percent animal matter in diet, and uptake from plants.

7. Page 1-3, DQO Step 5: Decision Rule. Step 5 states that statistical procedures will be used to compare groups of data. The procedures to be used must include graphical presentation of the data (e.g., side-by-side box plots), documentation and evaluation of any assumptions underlying each of the statistical tests to be completed, as well as an analysis of the power associated with each test.

   It is important to note that, while statistical procedures provide an objective means for decision making, they must be applied and their results interpreted with professional judgment. For example, it is possible that differences between groups will be apparent based on a graphical presentation of the data; however, a statistical test to compare the groups does not yield statistically significant results due to an inadequate sample size and/or high variability in sample results. High variability in sample results can be controlled for by including other factors that affect toxic equivalence (TEQ) concentrations in a statistical model (e.g., age and/or sex), improving the ability to identify a statistically significant difference in TEQ concentrations between groups. Data for factors which may significantly impact TEQ concentrations are also being collected and must be considered as part of the analysis to identify whether differences between groups are statistically significant.

8. Page 1-3, DQO Step 7: Optimize the Design. Step 7 states that, "If the data from the proposed study are insufficient, then subsequent studies may be designed..." The term "insufficient" must be defined.

9. Page 2-1, Section 2.1 - General Strategy. The text in this section must be revised as follows: This sampling plan is designed to simulate as close as possible the harvesting of edible portions of wild game**,** ~~animals~~ **deer, turkeys and rabbits,** by hunters within the Tittabawassee River floodplain **during the fall hunting season**.

10. Page 2-2, Section 2.3 - Sampling Objectives. In the third sentence, the following revision must be made: Relative to age, every effort will be made to avoid ~~juveniles~~ **fawns** and to try to harvest a similar age structure among locations.

11. Page 2-2, Section 2.3 - Sampling Objectives. Add before the last sentence: "If squirrels are selected, a single species present in both the reference and study

areas will be targeted for collection."

12. Page 2-3, Section 2.5 - Sample Designation. Appendix C does not appear to fully describe sample labeling procedures. This is an extremely important part of the study since incorrectly labeled samples misrepresent actual conditions and may result in misleading data and conclusions. Sample designation must be described in better detail.

13. Page 2-3, Section 2.6 - Sampling Frequency and Duration. Revise to indicate that sampling will occur in late fall (not early to late).

14. Page 2-3, Section 2.6 - Sampling Methodology and Design. In the third sentence, the following revision must be made: The method of take will include standard ~~archery and~~ firearm hunting practices (primarily shotgun and short-range center-fire rifle).

    Consideration should also be given to the use of rocket nets by USDA's Wildlife Services, which would allow them to pick and choose animals.

15. Page 2-3, Section 2.6 - Sampling Methodology and Design. The fifth bullet in this section must be revised as follows: Date and time of day of ~~capture~~ **harvest**.

16. Page 2-3, Section 2.7 - Sampling Methodology and Design. This section must be expanded to describe in detail data that will be collected for each animal. In addition to the bulleted items shown on pages 2-3 and 2-4, the identification number for each animal must be recorded and other items that were discussed in the September 18, 2003 meeting. For deer, this must include age, presence of BT, presences of chronic wasting disease, and for females, evidence whether the female has reproduced. It may be prudent to develop a simple form for use in the field.

17. Page 2-4, Section 2.8 - Sample Processing. Steps that will be taken to maintain accurate sample identification must be described in more detail.

18. Page 2-4, Section 2.8.1 - Deer Processing. This section is not clear as to whether the cubes from the three muscle groups will be combined in a single jar and homogenized together, kept in separate jars and then homogenized together, or kept separate and homogenized separately. The mass ratios among the three muscle groups must be the same from homogenate to homogenate, across deer. This might be accomplished most accurately by homogenizing cubes from each of the three muscle groups separately and then weighing out masses of homogenates to combine in an exact 2:1:1 ratio (rump: tenderloin: backstrap).

19. Page 2-4, Section 2.8.1 - Deer Processing. The third paragraph must be revised as follows: The deer heads will be submitted to MDNR for estimation of age **and testing for bovine tuberculosis (BT) and chronic wasting disease (CWD)**. If ~~released for human consumption~~ **the specimen tests negative for BT and CWD and does not contain elevated levels of dioxins and furans,** the meat will be processed~~, screened for bovine TB and chronic wasting disease (CWD)~~ and donated to charitable organizations.

20. Page 2-4, Section 2.8.2 - Turkey Processing. Same comment for turkey white and dark meat as for the three muscle samples from the deer.

21. Page 2-4, Section 2.8.2 - Turkey Processing. This section must be revised to describe how the turkeys will be sexed and aged. Please contact Mr. Daniel O'Brien of the MDNR at 517-373-9358 or obriend@michigan.gov if additional information is needed to respond to this comment.

22. Page 2-4, Section 2.8.2 - Rabbit Processing. This section must be revised to describe how the rabbits will be sexed and aged. Please contact Mr. O'Brien at the phone number or e-mail address provided above if additional information is needed to respond to this comment.

23. Page 2-5, Section 2.10 - Analytical Methodology and Detection Limits. The use of a standard reference material is necessary.

24. Page 2-7, Section 2.13 - Reporting of Analytical Results. Laboratory data must be compiled with the data collected in the field and submitted electronically to the MDEQ.

25. Page 2-8, Section 2-13.1 - Descriptive Statistics. Congener-specific concentrations of polychlorinated biphenyls (PCBs) must also be reported for the 25 percent of deer samples so analyzed. For PCDDs/PCDFs, and coplanar PCBs (cPCBs), when analyzed, TEQs for each congener and percent contribution of each congener to the total TEQ within a sample must also be reported to maximize transparency.

26. Page 2-7, Section 2.13.1 - Descriptive Statistics. Methods for statistically evaluating data (e.g., statistical distribution, outlier testing, calculating upper confidence limits for the mean) described in the 2003 Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria (S3TM) must be followed unless alternate procedures are warranted and adequately justified.

    Use of one half of the detection limit for concentrations below the detection limit is acceptable for data sets containing less than 50 percent nondetects. For datasets containing 50 percent or more nondetects, alternate methods must be

proposed for MDEQ review and approval.

27. Pages 2-7 and 2-8, Section 2.13.2 -Comparative Statistics. Before conducting comparative tests, methods for statistically evaluating data (e.g., statistical distribution of concentrations in each individual group, outlier testing) described in S3TM must be followed unless alternate procedures are warranted and adequately justified.

    Although it is appropriate to set preliminary levels for Type I and II error rates, it may be necessary to modify these based on the actual data collected.

    Reference materials supporting the proposed error rates (i.e., Type I less than 0.05 and Type II less than 0.2) must be provided.

    As stated previously, statistical procedures provide an objective means for decision making; however, they must be applied and their results interpreted with professional judgment. Therefore, graphical presentations (e.g., side-by-side box plots) must be prepared and submitted with statistical test results. These may provide evidence that additional data are necessary to identify that an observed difference between the groups is statistically significant.

    It is stated on Page 2-8 that multivariate analyses will be considered only if statistically significant differences are observed between groups. However, other data being measured in the field, laboratory, or by the MDNR (e.g., age and/or sex), must also be considered in the evaluation for statistically significant differences between groups. If factors exist that significantly impact TEQ concentrations in the animals being studied, controlling for these factors by including them in a statistical analysis may improve the precision of the model and the ability to identify statistically significant differences between groups.

28. Page 3-1, Section 3.2 - Reporting. This section must be revised to indicate that if any major deviations from the approved Work Plan are necessary because of unanticipated field conditions, the MDEQ (and MDNR and USFWS, if appropriate) will be notified as soon as possible for approval and modification of the Work Plan, if needed.

29. Section 4.0 - References. The S3TM document must be added to the list of references.

Appendix C, Site Specific Health and Safety Plan

30. Section 2.0 - Project Safety Authority. The text under the second bullet must be revised as follows: Verification of 40-hour **HAZWOPER and applicable HAZWOPER updates, supervisor** training**, and/or medical monitoring and fit**

test certifications for all potentially exposed on-site personnel.

31. Section 3.0 - Safety Orientation and Training. A subsection must be added to address medical monitoring requirements and certifications for personnel who perform field sampling wherein the duties may result in chemical exposure.

32. Section 4.2.2 - Chemical Hazard Assessment and Protective Measures. While it is true that dioxins are not volatile in nature and one would not anticipate inhalation to be a problem from the volatilized media, inhalation of dioxins could be a hazard if high winds and/or disturbing activities create blowing dust. The health and safety plan needs to address how hazards will be minimized in areas where potentially contaminated airborne dust may be present.

33. Section 5.0 - Air Monitoring and Control Measures. See the comment on Section 4.2.2, above. In addition, Section 7.1.1 in the plan makes reference to Table 5-1 which is missing from Section 5.0.

34. Section 6.0 - General Safety Precautions. With respect to the text under the eighth bullet, "Closed toe and heel shoes with good traction appropriate for walking on uneven surfaces," it seems more appropriate to require hiking boots or safety boots. Soft-sided shoes (tennis shoes) are not really appropriate for this type of field work. In addition, boots would provide better ankle support thus minimizing the potential for twisted ankles if field work is performed under rugged conditions.

35. Section 6.2 - Forbidden Practices. In order to avoid activities that could contribute to airborne dust (worker health issue) and to minimize track-out if vegetated areas are disturbed, the following bullet item must be added to this section: Avoid unnecessary ground disturbances in areas with potentially contaminated soils/sediments.

36. Section 7.1.1.1 - Protective Equipment Requirements, Basic Protective Clothing. Under the first bullet, "Fully enclosed hard-soled shoes," the above comment that boots may be more appropriate is applicable here as well.

    Under the third bullet, long sleeve shirts should be required in heavy brush areas or areas where the insect population may pose a problem. Given the fact that much of this work may be conducted in areas such as this, perhaps long sleeve shirts should be a basic protective clothing item.

Appendix D, Standard Operating Procedure (SOP) 214

37. Add sample matrix categories for deer, turkey, rabbit, and squirrel.

38. Consider whether the biological sampling areas correspond well to the collection locations for the wild game study.

39. Check and correct the spelling of Tittabawassee River throughout.

Appendix D, SOP 229

40. Add measures to ensure consistency of muscle tissue sampled across rabbits, e.g., specify muscle regions and/or remove all edible portions (difficult since rabbits are often cut in pieces like chickens and meat eaten off all bones except feet and heads) and/or use same person to dress all rabbits from all sampling locations.

41. Section 6.5.G. The text must be revised as follows: Rabbits will be dressed according to standard hunting practices, except that all **surfaces and** instruments ~~coming into~~ **which might** contact ~~with an individual rabbit~~ **the samples** will be rinsed with **reagent grade** acetone/hexane ~~to avoid contamination~~ before each rabbit is dressed.

    The Work Plan and other SOPs must also be checked for "reagent grade" description of rinse solvents and revised appropriately.

42. Section 2.0 - Scope and Application. The wording in this section about collecting cottontail rabbits within areas of the floodplain that are "annually hunted by the public" appears to be unnecessarily limiting (given that the properties may not all be open to the public for hunting) and must be revised.

43. Section 7.1 - Sampling Documentation. The text must be revised as follows: For each individual caught, the following observations and measurements ~~should~~ **will** be recorded.

44. Section 7.2 - Quality Assurance. Clarify whether certified clean sodium as the field blank should be revised to sodium sulfate, saline, or something else.

Appendix D, SOP 230

45. The first two comments regarding SOP 229 are also applicable to SOP 230. Also, the SOP must also clearly address the comments made on page 2-4 of the Work Plan, above.

46. Section 2.0 - Scope and Application. The wording in this section about collecting wild turkey within areas of the floodplain that are "annually hunted by the public" appears to be unnecessarily limiting (given that the properties may not all be open to the public for hunting) and must be revised.

47. Section 6.5 - Field Sampling Methodology. In B.-F., the word “should” needs to be replaced with the word “will” in several locations.

48. Section 7.1 - Sampling Documentation. The text must be revised as follows: For each individual caught, the following observations and measurements ~~should~~ **will** be recorded.

49. Section 7.2 - Quality Assurance. Clarify whether certified clean sodium as the field blank should be revised to sodium sulfate, saline, or something else.

Appendix D, SOP 231

50. The first two comments regarding SOP 229 are also applicable to SOP 231. Also, the SOP must also clearly address the comments made on page 2-4 of the Work Plan, above. In addition, the matrix spikes must include PCB congeners.

51. Section 2.0 - Scope and Application. The wording in this section about collecting white-tailed deer within areas of the floodplain that are “annually hunted by the public” appears to be unnecessarily limiting (given that the properties may not all be open to the public for hunting) and must be revised.

52. Section 6.5 - Field Sampling Methodology. In B.-F. and N., the word “should” needs to be replaced with the word “will” in several locations.

53. Section 7.1 - Sampling Documentation. The text must be revised as follows: For each individual caught, the following observations and measurements ~~should~~ **will** be recorded.

Appendix D, SOP 401

54. Section 3.2 - Waste Management. The text must indicate that waste management and disposal will be done in accordance with applicable local, state and federal regulations as well as with ENTRIX, Inc. regulations.

55. Section 3.2 - Sample Decontamination. This section must be revised to indicate that spills in the laboratory will be cleaned up.